Annual Accomplishments

OFFICE OF WEATHER AND AIR QUALITY
National Oceanic and Atmospheric Administration

ANNEX TO THE OWAQ ANNUAL ACCOMPLISHMENTS FY2019

Publications (both peer- and non-peer-reviewed)

Apodaca, K., Fletcher, S. J., Weygandt, S., & Lin, H. (in preparation). Non-Gaussian background error covariance matrix modeling of humidity and cloud hydrometeor control variables for the Gridpoint Statistical Interpolation system. In preparation for submission to *Journal of Applied Meteorology and Climatology*.

Bengtsson, L., Bao, J. W., Pegion, P., Penland, C., Michelson, S., & Whitaker, J. (2019). A model framework for stochastic representation of uncertainties associated with physical processes in NOAA's Next Generation Global Prediction System (NGGPS). *Monthly Weather Review*, *147*(3), 893-911.

Burke, A., Snook, N., Gagne, D. J., McCorkle, S., & McGovern, A. (2019). Calibration of machine learning-based probabilistic hail predictions for operational forecasting. *Weather and Forecasting*. https://doi.org/10.1175/WAF-D-19-0105.1

Butts, C. T. (2017). Comment: Actor orientation and relational event models. *Sociological Methodology, 47*(1), 47-56.

Cheung, K., Yu, Z., Elsberry, R. L., Bell, M., Jiang, H., Lee, T. C., ... & Tsuboki, K. (2018). Recent advances in research and forecasting of tropical cyclone rainfall. *Tropical Cyclone Research and Review*, *7*(2), 106-127.

Elbing, B. R., Petrin, C. E., & Van Den Broeke, M. S. (2018). Infrasound measurements from a tornado in Oklahoma. *Proceedings of Meetings on Acoustics*, *33*(1).

Elbing, B. R., Petrin, C. E., & Van Den Broeke, M. S. (2019). Measurement and characterization of infrasound from a tornado producing storm. *Journal of the Acoustical Society of America*, *146*(3), 1528-1540.

Gowan, T. M., Steenburgh, W. J., & Schwartz, C. S. (2018). Validation of mountain precipitation forecasts from the convection-permitting NCAR Ensemble and operational forecast systems over the Western United States. *Weather and Forecasting*, *33*(3), 739-765.

Grell, E. D., Bao, J. W., Kingsmill, D. E., & Michelson, S. A. (2018). On the importance of a consistent treatment of prognostic moisture variables between convective and microphysical parameterizations. *Monthly Weather Review*, *146*(5), 1527-1548.

Habibi, H., Dasgupta, I., Noh, S., Kim, S., Zink, M., Seo, D.-J., ... & Kerkez, B. (2019). High-resolution hydrologic forecas ting for very large urban areas. *Journal of Hydroinformatics*, *21*(3), 441-454.

Herman, G.R., & Schumacher, R. S. (2018). "Dendrology" in numerical weather prediction: What random forests and logistic regression tell us about forecasting extreme precipitation. *Monthly Weather Review*, *146*, 1785-1812.

Herman, G. R., & Schumacher, R. S. (2018). Flash flood verification: Pondering precipitation proxies. *Journal of Hydrometeorology*, *19*, 1753-1776.

Herman, G. R., & Schumacher, R. S. (2018). Money doesn't grow on trees, but forecasts do: Forecasting extreme precipitation with random forests. *Monthly Weather Review*, *146*, 1571-1600.

Hobbins, M. T., Rangwala I., Barsugli J. J., & Dewes C. F. (2019). Extremes in evaporative demand and their implications for drought and drought monitoring in the 21st Century. In A. M. Melesse, W. Abtew, & G. B. Senay (Eds.), *Extreme hydrology and climate variability: Monitoring, modeling, adaptation and mitigation* (pp. 325-341). New York, NY: Elsevier.

Hobbins, M. T., Senay, G. B., Gowda, P. H., & Artan G. A. (2019). Evapotranspiration and evaporative demand. In R. Teegavarapu, J. D. Salas, & J. R. Stedinger, (Eds.), *Statistical analysis of hydrological variables: Methods and applications* (pp. 71-143). Reston, VA: American Society of Civil Engineers-Environmental Water Resources Institute.

Hu, J., Yussouf, N., Turner, D., Jones, T. A., & Wang, X. (in preparation). Impact of ground-based remote sensing boundary layer observations on short-term probabilistic forecasts of a tornadic supercell event. In preparation for submission to *Weather and Forecasting*.

Jiang, H., Tao, C., & Pei, Y. (2019). Estimation of tropical cyclone intensity using satellite passive microwave observations. *Journal of Applied Meteorology and Climatology*, *58*, 185-197.

Jiang, H., Tao, C., & Pei, Y. (in press). Estimation of tropical cyclone intensity using satellite passive microwave observations. *Journal of Applied Meteorology and Climatology*.

Jiang, H., Zagrodnik, J. P., Tao, C., & Zipser, E. J. (2018). Classifying precipitation types in tropical cyclones using the NRL 37 GHz color product. *Journal of Geophysical Research: Atmospheres*, *123*(10), 5509-5524.

Johnson, A., & Wang, X. (in preparation). Impacts of inconsistencies between initial and lateral boundary condition perturbations in a multi-scale ensemble forecast system driven by GEFS at the lateral boundaries. In preparation for submission to *Monthly Weather Review*.

Jones, T. R., Randall, D. A., & Branson, M. D. (2019). Multiple-instance superparameterization, Part 1: Concept, and predictability of precipitation. *Journal of Advances in Modeling Earth Systems*.

Jones, T. R., Randall, D. A., & Branson, M. D. (2019). Multiple-instance Superparameterization, Part 2: The Effects of Stochastic Convection on the Simulated Climate. *Journal of Advances in Modeling Earth Systems*.

Knaff, J. A. (2017). A global statistical–dynamical tropical cyclone wind radii forecast scheme. *Weather and Forecasting*, *32*(2), 629-644.

Kumar, R., Lee, J. A., Delle Monache, L., & Alessandrini, S. (2019). Effect of meteorological variability on fine particulate matter simulations over the contiguous United States. *Journal of Geophysical Research: Atmospheres*, *124*(10), 5669-5694.

Labriola, J., Snook, N., Xue, M., & Thomas, K. (2019). Forecasting the 8 May 2017 severe hail storm in Denver Colorado at a convection allowing resolution: Understanding rimed ice treatments in multi-moment microphysics schemes and their effects on hail size forecasts. *Monthly Weather Review*. https://doi.org/10.1175/MWR-D-18-0319.1

Labriola, J., Snook, N., Xue, M., & Thomas, K. (conditionally accepted). Analysis of next-day hail forecasts using multi-moment microphysics schemes for the 8 May 2017 severe hail event in Colorado. *Monthly Weather Review*. http://doi.org/10.1175/MWR-D-18-0319.1

Lahmers T. M., Gupta, H. V., Gupta, & Castro, C. L. (2019). Enhancing the structure of the WRF-Hydro Hydrologic Model for semi-arid environments. *Journal of Hydrometeorology, 20*(4), 691-714.

Lee, H., Noh, S., Kim, S., Shen, H., Seo, D. -J., & Zhang, Y. (2018). Improving flood forecasting using conditional bias-penalized ensemble Kalman filter. *Journal of Hydrology*, *575*, 596-611.

Liu, C., Xue, M., & Kong, R. (2019). Direct assimilation of radar reflectivity data using 3DVAR: Treatment of hydrometeor background errors and OSSE tests. *Monthly Weather Review*, *147*(1), 17-29.

Loken, E. D., Clark, A. J., Xue, M., & Kong, F. (2019). Spread and skill in mixed-and single-physics convection-allowing ensembles. *Weather and Forecasting*, *34*(2), 305-330.

Mason, L. A., Gronewold, A.D., Laitta, M., Gochis, D., Sampson, K., Read, L., ... & Steeves, P. (2019). New transboundary hydrographic data set for advancing regional hydrological modeling and water resources management. *Journal of Water Resources Planning and Management*, *145*(6), 06019004-1-06019004-6.

Mazzoleni, M., Noh, S.J., Lee, H., Liu, Y., Seo, D. -J., Alfonso, L., & Solomatine, D. P. (2018). Real-time assimilation of streamflow observations into a hydrologic routing model: Effects of different model structures and updating methods. *Hydrological Sciences Journal*, *13*(3), 386-407.

McEvoy, D. J., Hobbins, M. T., Brown, T. J., VanderMolen, K., Wall, T., Huntington, J. L., & Svoboda, M. (2019). Establishing relationships between drought and wildfire danger indices: A test case for the California-Nevada Drought Early Warning System. *Climate*, *7*(52). http://doi.org/10.3390/cli7040052.

Mercer, A., Grimes, A., & Wood, K. (2018). Multidimensional kernel principal component analysis of false alarms of rapidly intensifying Atlantic tropical cyclones. *Procedia Computer Science*, *140*, 359-366.

Noh, S., Lee, J., Lee, S., Kawaike, K., & Seo, D.-J. (2018). Hyper-resolution 1D-2D urban flood modelling using LiDAR data and hybrid parallelization. *Environmental Modeling and Software*, *103*, 131-145.

Noh, S. J., Weerts, A., Rakovec, O., Seo, D., & Lee, H. (2018). Assimilation of streamflow observations. In Q. Duan, F. Pappenberger, J. Thielen, A. Wood, H. Cloke, H., & J. C. Schaake. (Eds.), *Handbook of Hydrometeorological Ensemble Forecasting* (pp. 745-780). Berlin: Springer.

Olson, M. K., Vos, S.C., & Sutton, J. (in preparation). Threat and efficacy in television news: Reporting on an emerging infectious disease. In preparation for submission to *Science Communication*.

Note: Publications list sourced from Principal Investigator reports and reconciled to OWAQ Annual Operating Plan metrics. Includes publications for projects active in FY2019 or for completed projects with publications and presentations in FY2019.

Pegion, K., Kirtman, B. P., Becker, E., Collins, D. C., LaJoie, E., Burgman, R., ... & Li, W. (2019). The Subseasonal Experiment (SubX): A multimodel subseasonal prediction experiment. *Bulletin of the American Meteorological Society*, *100*(10), 2043-2060.

Pei, Y., & Jiang, H. (2018). Quantification of precipitation asymmetries of tropical cyclones using 16-Year TRMM observations. *Journal of Geophysical Research: Atmospheres*, *123*(15), 8091-8114.

Potvin, C. K., Carley, J. R., Clark, A. J., Wicker, L. J., Skinner, P. S., Reinhart, A. E., ... & Brewster, K. A. (2019). Systematic comparison of convection-allowing models during the 2017 NOAA HWT Spring Forecasting Experiment. *Weather and Forecasting*, *34*(5), 1395-1416.

Potvin, C., Carley, J. R., Clark, A. J., Wicker, L. J., Skinner, P. S., Reinhart, A. E., ... & Xue, M. (2019). Systematic comparison of convection-allowing models during the 2017 NOAA HWT Spring Forecasting Experiment. *Weather and Forecasting, 34*(5), 1395-1416.

Schaffer, J. D. (2019). Using evolutionary programming to generate a tropical cyclone intensity model (unpublished M.S. Thesis). University of Wisconsin-Milwaukee. Available online at https://dc.uwm.edu/cgi/viewcontent.cgi?article=3123&context=etd.

Schwartz, C. S., Romine, G. S., Sobash, R. A., Fossell, K. R., & Weisman, M. L (2019). NCAR's real-time convection-allowing ensemble project. *Bulletin of the American Meteorological Society*, *100*(2), 321-343.

Shen, H., Seo, D. -J., & Lee, H. (submitted 2019). Adaptive conditional bias-penalized Kalman filter for improved estimation of extremes and its approximation for reduced computation. Submitted to *IEEE Signal Processing*.

Snook, N., Kong, F., Brewster, K. A., Xue, M., Thomas, K. W., Supinie, T. A., ... & Albright, B. (2019). Evaluation of convection-permitting precipitation forecast products using WRF, NMMB, and FV3 for the 2016-2017 NOAA Hydrometeorology Testbed Flash Flood and Intense Rainfall Experiments. *Weather and Forecasting*, *34*, 781-804.

Sutton, J., Vos, S. C., Olson, M. K., Woods, C. W., Cohen, E., Gibson, C. B., ... & Butts, C.T. (2018). Lung cancer messages on Twitter: Content analysis and evaluation. *Journal of the American College of Radiology*, *15*(1), 210-217.

Sutton, J. N., & Kaufmann, R. (2018). Designing imminent threat messages for an unfamiliar hazard. *Communication Teacher*, *32*(4), 215-219.

Tong, D. Q., Wang, J. X., Gill, T. E., Lei, H., & Wang, B. (2017). Intensified dust storm activity and Valley Fever infection in the southwestern United States. *Geophysical Research Letters*, *44*(9), 4304-4312.

Vigaud, N., Robertson, A. W., & Tippett, M. K. (2017). Multimodel ensembling of subseasonal precipitation forecasts over North America. *Monthly Weather Review*, *145*(10), 3913-3928.

Vos, S. C., Sutton, J., Gibson, C. B., & Butts, C. (in preparation). Theorizing the diffusion of public health messages on social networking sites. In preparation for submission to *Journal of Health Communication*.

Vos, S. C., Sutton, J., Yue, Y., Renshaw, S. L., Olson, M. K., Gibson, C. B., & Butts, C.T. (2018). Retweeting risk communication: The role of threat and efficacy. *Risk Analysis, 38*(2), 2580-2598.

Wong, M., Romine, G., & Snyder, C. (2019). Model improvement via systematic investigation of physics tendencies. *Monthly Weather Review,* https://doi.org/10.1175/MWR-D-19-0255.1

Xu, X., Chen, F., Barlage, M., Gochis, D., Miao, S., & Shen, S. (2019). Lessons learned from modeling irrigation from field to regional scales. *Journal of Advances in Modeling Earth Systems, 11,* 2428-2448.

Yussouf, N., Knopfmeier, K., Skinner, P., Hu, J., Jones, T., Choate, J., ... & Wang, X. (in preparation). The NSSL experimental Warn-on-Forecast System for ensembles (NEWS-e) at 2018 NOAA Hydrometeorology Testbed Flash Flood and Intense Rainfall (HMT-FFaIR) Experiment. In preparation for submission to *Weather and Forecasting*.

Zhang, C., Xue, M., Supinie, T. A., Kong, F., Snook, N., Thomas, K. W., ... & Lin, S. J. (2019). How well does an FV3-based model predict precipitation at a convection-allowing resolution? Results From CAPS forecasts for the 2018 NOAA Hazardous Weather Testbed with different physics combinations. *Geophysical Research Letters*, *46*(6), 3523-3531.

Note: Publications list sourced from Principal Investigator reports and reconciled to OWAQ Annual Operating Plan metrics. Includes publications for projects active in FY2019 or for completed projects with publications and presentations in FY2019.

Presentations

Apodaca K., Fletcher S. J., & Zupanski M. (2018, October). Advances in new data assimilation and observations for the benefit of NOAA operations. Talk presented at the NOAA/AOML/Hurricane Research Division Fall Seminar Series, Miami, FL.

Bengtsson, L., Bao, J. -W., Pegion, P., Michelson, S., Penland, C., & Whitaker, J. (2018, April). A stochastic model framework for representing uncertainties in the Next Generation Global Prediction System associated with unresolved flows. Talk presented at the EGU General Assembly 2018, Vienna, Austria.

Bengtsson, L., Bao, J. -W., Pegion, P., & Whitaker, J. (2018). Representing uncertainties in the NOAA/NCEP Next Generation Global Prediction System associated with unresolved convection. Talk presented at the 29th Conference on Weather Analysis and Forecasting, Denver, CO.

Butts, C. T., Sutton, J., Gibson, C .B., Li, K., Olson, M. K., Phillips, N. E., ... & Yu, Y. (2017, July). HEROIC project update: Predictors of message passing, social media adoption, and social media use in meteorological and health hazard settings. Talk presented at Natural Hazards Research and Applications Workshop. Boulder, CO.

Chai, T., Kim, H., & Stein, A. (2018, October). Estimating smoke emission using GOES satellite observations and HYSPLIT model. Talk presented at the 17th Annual Community Modeling and Analysis System Conference, Chapel Hill, NC.

Chai, T., Kim, H., Stein, A. & Kondragunta, S. (2018, November). Estimating smoke emissions by assimilating satellite observations with HYSPLIT model. Talk presented at the 9th International Workshop on Air Quality Forecasting Research (IWAQFR), Boulder, CO.

Chandrasekar, V. (2017, July). Presentation on x-band radars. Talk presented at the IEEE International Geoscience and Remote Sensing Symposium (IGARSS), Fort Worth, TX.

Chen, F., Xu, X., Barlage, M., Gochis, D.J., Liu, X., Niyogi, D., ... & Di, L. (2019, January). Challenges in representing hydroclimatic effects of agriculture management in earth-system models. Talk presented at the 33rd Conference on Hydrology, Phoenix, AZ.

Chirokova G., Kaplan, J., & Knaff, J. (2018, March). Improvements to operational statistical tropical cyclone intensity forecast models using wind structure and eye predictors. Talk presented at the 2018 Tropical Cyclone Operations and Research Forum (TCORF)/71th Interdepartmental Hurricane Conference (IHC), Miami, FL.

Chirokova G., Knaff, J., & Schumacher, A. (2016, March). Improvements to operational statistical tropical cyclone intensity forecast models. Talk presented at the 2016 Tropical Cyclone Operations and Research Forum (TCORF)/70th Interdepartmental Hurricane Conference (IHC), Miami, FL.

Chirokova G., Knaff, J., & Schumacher, A. (2017, March). Improvements to operational statistical tropical cyclone intensity forecast models. Talk presented at the 2017 Tropical Cyclone Operations and Research Forum (TCORF)/70th Interdepartmental Hurricane Conference (IHC), Miami, FL.

Chu, P., Anderson, E., Mann, G., Fujisaki-Manome, A., & Fitzpatrick, L. (2019, June). Talk presented at the International Great Lakes Annual Conference, Brockport, NY.

Chu, P., Mann, G., & Fujisaki-Manome, A. (2019, May). Talk presented at the National Weather Service Great Lakes Operational Meteorology Workshop, Duluth, MN.

Djalalova I.V., Wilczak, J.M., Allured, D., Huang, J., McQueen, J., Stajner, I., ... & Alessandrini, S. (2018, November). Post-processing of surface ozone from the Community Multiscale Air Quality (CMAQ) model. Talk presented at the International Workshop on Air Quality Forecasting Research (IWAQFR), Boulder, CO.

Evans, C. (2018, June). A preliminary evaluation of paired regional/convection-allowing model-forecast vertical profiles in warm-season, thunderstorm-supporting environments. Talk presented at the AMS WAF/NWP Conference, Denver, CO.

Forsythe, J. (2019, October). Applications of layer precipitable water products from microwave satellite retrievals and forecast model integration. Talk presented at the AMS Satellite Meteorology and Oceanography Conference, Boston, MA.

Forsythe, J. (2019, September). The CIRA advected layered precipitable water product and applications to help forecasts hazardous precipitation events. Poster presented at the National Weather Association Annual Meeting, Huntsville, AL.

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Forsythe, J., Bikos, D., Kidder, S. Q., Jones, A. S., Szoke, E. J., & Fletcher, S .J. (2019, January). Satellite and model layer precipitable water products to support forecasting of heavy precipitation events. Talk presented at the AMS Hydrology Conference, American Meteorological Society Annual Meeting, Phoenix, AZ.

Fujisaki-Manome, A., Chu, P., & Fitzpatrick, L. (2018, June). Talk presented at the International Great Lakes Annual Conference, Toronto, Canada.

Gibson, C. B., & Butts, C. T. (2016, August). Relational event modeling of emergency management organizations' communications during the Boston marathon bombing. Talk presented at the American Sociological Association. Seattle, WA.

Grimes, A., & Mercer, A. (2017, November). Diagnosing significant magnitude and spatial field differences governing rapid intensification of tropical cyclones. Talk presented at the Southeast Division of the American Association of Geographers, Starkville, MS.

Grimes, A., & Mercer, A. (2019, April). Atlantic Basin rapid intensification prediction enhancement through numerical weather prediction spatial information. Talk presented at the 1st Workshop on Leveraging Artificial Intelligence in the Exploitation of Satellite Earth Observations & Numerical Weather Prediction, College Park, MD.

Grimes, A., Mercer, A., & Wood, K. (2018, April). Evaluation of machine-learning based rapid intensification forecast performance during the 2017 Atlantic hurricane season. Talk presented at the 33rd Conference on Hurricanes and Tropical Meteorology. Ponte Vedra Beach, FL.

Gronewold, A., Pei, L., Gochis, D., Mason, L., Sampson, K.M., Dugger, A.L., Read, L., ... & Chu, P.Y. (2017, December). Customizing WRF-Hydro for the Laurentian Great Lakes Basin. Talk presented at the American Geophysical Union Fall Meeting, New Orleans, LA.

Hu, J., Yussouf, N., Jones, T.A., & Turner, D.D. (2018, June). Impact of ground-based remote sensing boundary layer observations on convective-scale. Talk presented at the 29th Conference on WAF/25th Conference on NWP, Denver, CO.

Jiang, H. (2018, April). Tropical cyclone passive microwave intensity estimation (PMW-IE) model. Talk presented at the AMS 33rd Conference on Hurricanes and Tropical Meteorology, Ponte Vedra, FL.

Jiang, H., Pei, Y., & Tao, C. (2018, March). Estimation of tropical cyclone intensity using satellite passive microwave observations. Talk presented at the 72nd Interdepartmental Hurricane Conference/Tropical Cyclone Research Forum, Miami, FL.

Jiang, H., Pei, Y., & Wang, X. (2019, March). Estimation of tropical cyclone intensity using satellite passive microwave observations: Year 2 update. Talk presented at the 73rd Interdepartmental Hurricane Conference/2019 Tropical Cyclone Research Forum, Miami, FL.

Johnson, A. & Wang, X. (2018, June). Improving National Weather Service convection-allowing hazardous weather ensemble forecasts through optimizing multi-scale initial condition (IC) perturbations. Talk presented at the American Meteorological Society Annual Meeting 29th Conference on Weather Analysis and Forecasting/25th Conference on Numerical Weather Prediction, Denver, CO.

Johnson, A., & Wang, X. (2019, January). Improving storm scale ensemble forecast performance by optimizing multi-scale initial condition perturbations. Talk presented at the American Meteorological Society Annual Meeting Annual Meeting, Phoenix, AZ.

Kim, H., Chai, T., Stein, A. & Kondragunta, S. (2018, December). A HYSPLIT-based fire emission inverse modeling system for smoke forecast. Talk presented at the American Geophysical Union Fall Meeting, Washington D.C.

Kim, S., Noh, S., Seo, D.-J., Welles, E., Pelgrim, E., Weerts, A ... & Wells, E. (2018, December). Nested hyper-resolution modeling for the National Water Model–The Dallas-Fort Worth Testbed. Talk presented at the American Geophysical Union Annual Meeting, Washington, D.C.

Kim, S., Noh, S., Seo, D.J., Welles, E., Pelgrim, E., Weerts, A., ... & Wells, E. (2019, January). Nested hyper-resolution modeling and assimilation of water level data using WRF-hydro, OpenDA and the Community Hydrologic Prediction System. Talk presented at the American Meteorological Society Annual Meeting Annual Meeting, Phoenix, AZ.

Kirstetter, P.E. (2018, August). Probabilistic quantitative precipitation estimates with ground- and space-based remote sensing. Talk presented at the National Weather Center, University of Oklahoma, Norman, OK.

Kirstetter, P.E. (2018). Probabilistic quantitative precipitation estimates with ground- and space-based remote sensing. Talk presented at the Laboratoire de Meteorologie Physique, Clermont-Ferrand, France.

Note: Publications list sourced from Principal Investigator reports and reconciled to OWAQ Annual Operating Plan metrics. Includes publications for projects active in FY2019 or for completed projects with publications and presentations in FY2019.

Kirstetter, P.E. (2018). Probabilistic quantitative precipitation estimates with ground- and space-based remote sensing. Talk presented at the Laboratoire Atmospheres, Milieux, Observations Spatiales, Paris, France.

Kirstetter, P.E. (2018). Probabilistic quantitative precipitation estimates with ground- and space-based remote sensing. Talk presented at the Laboratoire des Sciences du Climat et de l'Environnement, Paris, France.

Kirstetter, P.E. (2018). Probabilistic quantitative precipitation estimates with ground- and space-based remote sensing. Talk presented at the National Center for Atmospheric Research, Boulder, CO.

Kirstetter, P.E., Gourley, J., & Zhang, J. (2018, December). Probabilistic quantitative precipitation estimates with ground- and space-based remote sensing. Talk presented at the European Geophysical Union General Assembly 2018, Vienna, Austria.

Kirstetter, P.E., Gourley, J., & Zhang, J. (2018, July). Probabilistic quantitative precipitation estimates with ground- and space-based radars. Keynote talk on Quantitative Precipitation Estimation, Talk presented at the 10th European Conference on Radar in Meteorology (ERAD2018), Ede-Wageningen, Netherlands.

Kirstetter, P.E., Gourley, J., Zhang, J. (2018, January). Probabilistic quantitative precipitation estimates with ground and space-based radars. Talk presented at the 98th American Meteorological Society Annual Meeting, Austin, TX.

Kirstetter, P.E., Gourley, J.J., & Zhang, J. (2018, December). Probabilistic quantitative precipitation estimates with ground- and space-based remote sensing. Talk presented at the American Geophysical Union Fall Meeting, Washington, D.C.

Kirstetter, P.E., Zhang, J., & Gourley, J. (2018, November). Probabilistic quantitative precipitation estimates with ground- and space-based remote sensing. Talk presented at the 9th International Precipitation Working Group workshop (IPWG-9), Seoul, South Korea.

Kirstetter, P.E., Zhang, J., & Gourley, J.J. (2019, January). Probabilistic quantitative precipitation estimates with ground-based radar networks. Talk presented at the American Meteorological Society Annual Meeting Annual Meeting, Phoenix, AZ.

Knaff, J.A., Chirokova, G., Sampson, C.R., & DeMaria, M. (2016). Development of global statistical-dynamical tropical cyclone wind radii and MSLP guidance. Talk presented at the 32nd AMS Conference on Hurricanes and Tropical Meteorology, April 18-20, 2016, San Juan, Puerto Rico.

Kumar, R., Lee, J., Alessandrini, S., & Delle Monache, L. (2018, December). A novel ensemble design for probabilistic predictions of fine particulate matter over the United States. Talk presented at the American Geophysical Union Fall Meeting, Washington, D.C.

Lahmers T. M., Hazenberg, P., Gupta, H.V., Castro, C.L., Gochis, D.J., Dugger, A.L., Yates, D.N., ... & Cosgrove, B. (2018, December). Enhancements to the WRF-Hydro hydrologic model structure for semi-arid environments. Talk presented at the American Geophysical Union Fall Meeting, Washington, D.C.

Lahmers T.M., Gupta, H.V., Hazenberg, P., Castro, C.L., Gochis, D.J., Yates, D.N., ... & Goodrich, D.C. (2017, December). Enhancements to the WRF-Hydro hydrologic model structure for semi-arid environments. Talk presented at the American Geophysical Union Fall Meeting, New Orleans, LA.

Lee, J.A., Kumar, R., Delle Monache, L., Alessandrini, S., & Lee, P. (2018, January). A novel ensemble design for probabilistic predictions of PM2.5 for the NAQFC. Talk presented at the 20th Joint Conference on the Applications of Air Pollution Meteorology with the Air and Waste Management Association and the American Meteorological Society, Austin, TX.

Lee, J.A., Kumar, R., Delle Monache, L., Alessandrini, S., & Lee, P. (2018, December). Probabilistic predictions of PM2.5 using a novel ensemble design for the NAQFC. Talk presented at the American Geophysical Union Fall Meeting, New Orleans, LA.

Mann, G. (2018). University of Michigan Climate Sciences Department seminar, Ann Arbor, MI.

Mann, G., & Fitzpatrick, L. (2018). Talk presented at the NOAA Great Lakes Operational Meteorology Workshop, Cleveland, OH.

Martinaitis, S., Osborne, A., Langston, C., Zhang, J., & Howard, K. (2018, August). Improving coverage and accuracy of precipitation estimates for NOAA and NWS through a multi-sensor precipitation scheme. Talk presented at the 43rd National Weather Association Annual Meeting, St. Louis, MO.

Martinaitis, S., Langston, C., Osborne, A., Zhang, J., Howard, K., & Qi, Y. (2018, January). Advancing precipitation estimation in data-sparse regions–The MRMS Multi-Sensor QPE product. Talk presented at the 32nd Conference on Hydrology American Meteorological Society Annual Meeting, Austin, TX.

Note: Publications list sourced from Principal Investigator reports and reconciled to OWAQ Annual Operating Plan metrics. Includes publications for projects active in FY2019 or for completed projects with publications and presentations in FY2019.

Martinaitis, S., Osborne, A., Simpson, M., Langston, C., Zhang, J., & Howard, K. (2019, January). Improving coverage and accuracy of precipitation estimates for NOAA and NWS through a multi-sensor precipitation scheme. Talk presented at the 33rd Conference on Hydrology American Meteorological Society Annual Meeting, Phoenix, AZ.

Mercer, A., Grimes, A., & Wood, K. (2018, November). Multi-dimensional kernel principal component analysis of false alarms of rapidly intensifying tropical cyclones. Talk presented at the Complex and Adaptive Systems Conference, Chicago, IL.

Mercer, A., Grimes, A., & Wood, K. (2019, January). An updated machine-learning ensemble for Atlantic tropical cyclone rapid intensification forecasting. Talk presented at the 18th Conference on Artificial and Computational Intelligence and its Applications to the Environmental Sciences, American Meteorological Society Annual Meeting Annual Meeting, Phoenix, AZ.

Mercer, A., Grimes, A., & Wood, K. (2019, March). An updated machine-learning ensemble for Atlantic tropical cyclone rapid intensification. Talk presented at the 73rd Tropical Cyclone Operations and Research Forum, Miami, FL.

Mercer, A., Wood, K., & Grimes, A. (2018, March). Transition of machine-learning based rapid intensification forecasts to operations. Talk presented at the Tropical Cyclone Research and Operations Forum, Miami, FL.

Noh, S., Kim, S., Habibi, H., Seo, D.-J., Welles, E., Philips, B., ... & Wells, E. (2017, December). Nested hyper-resolution modeling of urban areas for the National Water Model–The Dallas-Fort Worth Testbed. Talk presented at the American Geophysical Union Meeting, New Orleans, LA.

Noh, S., Lee, J., Lee, S., Zhang, Y., & Seo, D.-J. (2017, December). Dynamic inundation mapping of Hurricane Harvey flooding in the Houston metro area using hyper-resolution modeling and quantitative image reanalysis. Talk presented at the American Geophysical Union Meeting, New Orleans, LA.

Noh, S.J., Seo, D.-J., McCreight, J., RafieeiNasab, A., Hoar, T. J, Gharamti, M., ... & Vukicevic, T. (2019, December). Real-time assimilation of streamflow into regional- scale channel routing modeling using coupled WRF-Hydro and DART. Talk presented at the Conference on Transition of Research to Operations, American Meteorological Society Annual Meeting, Phoenix, AZ.

Noh, S.J., Seo, D.-J., McCreight, J., RafieeiNasab, A., Hoar, T.J., El Gharami, M., ... & Vukicevic, T. (2019, December). Real-time assimilation of streamflow into the National Water Model channel routing using coupled WRF-hydro and DART. Talk presented at the American Meteorological Society Annual Meeting, Phoenix, AZ.

Noh, S.J., Seo, D.-J., RafieeiNasab, A., McCreight, J., Gochis, D., Cosgrove, B., & Vukicevic, T. (2018, January). Assimilation of real-time streamflow observations for the National Water Model using ensemble Kalman filter. Talk presented at the American Meteorological Society Annual Meeting, Austin, TX.

Olson, M.K., Sutton, J., & Vos, S.C. (2016, December). Communicating threat and efficacy through the media: An analysis of news broadcasts about the Zika virus. Talk presented at the Society for Risk Analysis. San Diego, CA.

Olson, M.K., Sutton, J., & Vos, S.C. (2017, April). Threat and efficacy messages in television news following local transmission of the Zika virus in the United States. Talk presented at the District of Columbia Health Communication Conference. Fairfax, VA.

Philips, B. (2017, January). CASA WX: An innovation environment for bringing x-band weather radars into service and commercial success. Talk presented at the 33rd Conference on Environmental Information Processing Technologies, 12th Symposium on Societal Applications: Policy, Research and Practice; and the Seventh Conference on Transition of Research to Operations at American Meteorological Society, Seattle, Washington.

Philips, B. Invited presenter for two National Academies studies.

RafieeiNasab, A., McCreight, J., Gochis, Noh, S. J., & Seo, D.-J. (2017, December). Ensemble streamflow assimilation with the National Water Model. Talk presented at the American Geophysical Union Fall Meeting, New Orleans, LA.

RafieeiNasab, A., McCreight, J., Hoar, T. J., El Gharamti, M., Noh, S. J., & Gochis, D. (2018, December). Regional scale ensemble streamflow assimilation with coupled WRF-Hydro and DART. Talk presented at the American Geophysical Union Fall Meeting, Washington, D.C.

Robertson, A. W., Vigaud, N., Yuan, J., Tippett, M., & Collins, D. (2018, December). Calibrated multi-model probabilistic subseasonal forecasts based on SubX and S2S models. Talk presented at the American Geophysical Union Fall Meeting, San Francisco, CA.

Romine, G.S., (2018). Development and testing of single-model convection-allowing ensemble forecast systems. Talk presented at the Environmental Modeling Center, College Park, MD.

Note: Publications list sourced from Principal Investigator reports and reconciled to OWAQ Annual Operating Plan metrics. Includes publications for projects active in FY2019 or for completed projects with publications and presentations in FY2019.

Romine, G.S., Schwartz, C., & Fossell, K. (2018, June). Assessment of covariance inflation options for a continuously-cycled mesoscale EnKF analysis system. Talk presented at the 25th Conference on Numerical Weather Prediction, Denver, CO.

Romine, G.S. (2017). The NCAR ensemble project: Lessons learned and current progress in convection-permitting ensemble design. Talk presented at the NCEP Production Suite Review, Camp Springs, MD.
Romine, G.S., Schwartz, C., & Fossell, K. (2018, June). Assessment of covariance inflation options for a continuously-cycled mesoscale EnKF analysis system. Talk presented at the 25th Conference on Numerical Weather Prediction, Denver, CO.
Schumacher A., Chirokova, G., Knaff, J., & DeMaria, M. (2018, January). Improvements to operational statistical tropical cyclone intensity forecast models. Talk presented at the 98th AMS Annual Meeting / 22nd Conference on Satellite Meteorology and Oceanography, Austin, TX.

Schwartz, C.S., Romine, G.S., Sobash, R.A., Fossell, K.R., & Wong, M. (2018, June). Evaluating the NCAR ensemble's initialization approach. Talk presented at the 25th Conference on Numerical Weather Prediction, Denver, CO.
Schwartz, C.S., Romine, G.S., Sobash, R.A., Fossell, K.R., & Wong, M. (2018, June). Evaluating the NCAR ensemble's initialization approach. Talk presented at the 25th Conference on Numerical Weather Prediction, Denver, CO.
Seo, B.-C., Quintero, F., & Krajewski, W.F. (2019, January). Evaluation of hydrologic predictions based on multi-model and multi-precipitation product forcing. Talk presented at the 33rd Conference on Hydrology, 99th AMS Annual Meeting, Phoenix, AZ.

Seo, D.-J., Habibi, H., Dasgupta, I., Bartos, M.D., Noh, S., ... & Kerkez, B. (2018, December). High-resolution hydrologic forecasting for very large urban areas. Talk presented at the American Geophysical Union Annual Meeting, Washington, D.C.

Shen, H., Lee, H.S., Noh, S., Kim, S., Seo, D.-J., & Zhang, Y. (2018, December). Conditional bias-penalized Kalman filter for improved state estimation over the tails of distribution. Talk presented at the American Geophysical Union Annual Meeting, Washington, D.C.

Sobash, R., Romine, G.S., Schwartz, C., Fossell, K.R., & Ahijevych, D. (2018). The NCAR ensemble project: Lessons learned and current progress in convection-permitting ensemble design. Talk presented at the NCEP Production Suite Review, Camp Springs, MD.

Sobash, R.A., Schwartz, C.S., Romine, G.S., & Weisman, M.L. (2018, October). Explicit forecasts of low-level rotation with convection-allowing models using 1-km horizontal grid spacing. Talk presented at the 29th Conference on Severe Local Storms, Stowe, VT.

Stajner, I., McQueen, J., Lee, P., Huang, J., Huang, H. C., Tang, Y., ... & Pan, L. (2018, December). Recent updates to the NOAA National Air Quality Forecast Capability Operational Model. Talk presented at the American Geophysical Union Annual Meeting, Washington, D.C.

Stajner, I., McQueen, J., Lee, P., Huang, J., Huang, H.-C., Pan, L., ... & Tirado, J. (2018, September). National Air Quality Forecast Capability prediction updates: Bias correction for ozone. Talk presented at the Community Modeling and Analysis System, Rossland, British Columbia.

Sutton, J. (2015). Effective crisis communication on social media and other short-messaging platforms. Talk presented at the National Science Foundation, Enabling Fellows Seminar.

Sutton, J. (2015). Terse messaging on social media. Talk presented at the Federal Communications Commission – Communications Security, Reliability, and Interoperability Committee. Working Group 2, Subcommittee on Alerts and Warnings.

Sutton, J. (2016, April). Designing disaster warnings for behavioral change: The intersection of technological innovation and effective messages. Talk presented at the Broadcast Educators Association, Risk and Health Communication Symposium. Las Vegas, NV.

Sutton, J. (2016). Effective crisis communication on social media and other short-message platforms. Talk presented at The Future of Emergency Alert and Warning Systems: Research Directions. National Academy of Sciences, Washington, D.C.

Sutton, J. & Vos, S.C. (2015). Effective crisis communication on social media and other short-message platforms. Talk presented at the Centers for Disease Control and Prevention. Atlanta, GA.

Sutton, J., Olson, M.K., Vos, S.C., Yu, Y., Renshaw, S., Gibson, B., & Butts, C.T. (2017, December). Modeling social media engagement across the disaster continuum. Talk presented at the Society for Risk Analysis. Arlington, VA.

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Sutton, J., Vos, S.C., Phillips, N.E., Gibson, C.B., & Butts, C. T. (2017, May). Public conversations about cancer on social networking sites: Identifying focusing events and topic trends. Talk presented at the Markey Cancer Center Research Day. Lexington, KY.

Sutton, J. (2015). Episodic risk communication over short messaging devices. Talk presented at the University of Kentucky College of Communication and Information, NIOSH/CDC. Lexington, KY.

Vos, S.C. & Sutton, J. (2016). Designing messages for diffusion: Using SNS effectively during a public health crisis. Talk presented at the National Communication Association. Philadelphia, PA.

Vos, S.C. & Sutton, J. (2017, March). Zika risk communication on Twitter: Message design features. Talk presented at the Zika Communication Summit. Annerberg Public Policy Center, Philadelphia, PA.

Vos, S.C., & Sutton, J. (2016, October). Increasing the retransmission of public health messages on SNS: Empirically based recommendations from the Zika and Ebola crises. Talk presented at the American Public Health Association. Denver, CO.

Vos, S.C., & Sutton, J. (2016, April). Is a picture worth 1,000 retweets? The role of images in the diffusion of public health messages on SNS. Talk presented at the Kentucky Conference on Health Communication. Lexington, KY.

Vos, S.C., Olson, M., & Sutton, J. (2017, April). Public conversations about cancer on social networking sites: Analyzing responses to Ben Stiller's prostate cancer moment. Talk presented at the DC Health Communication Conference, Fairfax, VA.

Vos, S.C., Phillips, N.E., & Sutton, J. (2017, May). Identifying naturally occurring interventions related to cancer on social networking sites: Focusing events and public discussion. Talk presented at the International Communication Association, San Diego, CA.

Vos, S.C., Sutton, J., & Olson, M. (2017, December). Communicating visual risk: Threat, efficacy, and emotion in SNS messages about Zika. Talk presented at the Society for Risk Analysis. San Diego, CA.

Wilczak, J.M., & Djalalova, I.V. (2018, September). Potential new directions for CMAQ post-processing: Probabilistic air quality forecasts. Talk presented at the NOAA's National Centers for Environmental Prediction Air Quality Forecaster Focus Group Workshop, College Park, MD.

Wong, M., Romine, G.S., & Snyder, C. (2018, June). A comparison of the impact of using downscaled and convection-permitting analyses on model behavior. Talk presented at the 25th Conference on Numerical Weather Prediction, Denver, CO.

Xiao, C. (2018, January). Implementing the WRF-Hydro modeling system in the Great Lakes Region. Talk presented at the American Meteorological Society Annual Meeting, Austin, TX.

Yates, D.,N., Read, L., Barlage, M.J., & Gochis, D. (2017, December). Advancing the explicit representation of lake processes in WRF-Hydro. Talk presented at the American Geophysical Union Fall Meeting, New Orleans, LA.

Yussouf N., Heinselman, P.L., Jones, T.A., Skinner, P.S., Dowell, D.C., & Wang, X. (2018, January). Applications of warn-on-forecast for flash-flood producing extreme convective rainfall events. Talk presented at the 29th Conference on WAF/25th Conference on NWP, Denver, CO.

Yussouf, N., Hu, J., Jones, T., Wang, X., & Turner, D. (2018, January). Warn-on-Forecast (WoF) for flash flood producing extreme convective rainfall. Talk presented at the 8th Conference on Transition of Research to Operations, American Meteorological Society Annual Meeting, Austin, TX.

Yussouf, N., Jones, T.A., & Turner, D.D. (2017, October). Assimilation of ground-based remote sensing observations into storm-scale NWP for a tornadic event during PECAN Field Campaign. Talk presented at the Special Symposium on Severe Local Storms, American Meteorological Society, Seattle, WA.

Yussouf, N., Knopfmeier, K., Skinner, P., Hu, J., Jones, T., Choate, J., ... & Wang, X. (2018, October). The NSSL experimental warn-on-forecast system for ensembles at the 2018 NOAA Hydrometeorology Testbed Experiments. Talk presented at the 29th Conference on Severe Local Storms, American Meteorological Society, Stowe, VT.

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